

Pre-Inspection Checklist for Low Pressure Steam Boilers

Spring 2003

Notice: This checklist reflects the most common violations our field inspectors encounter when performing an inspection on low pressure steam boiler installations. It's suggested that boiler industry personnel have access to a current set of applicable codebooks/jurisdictional laws. Such as: **Section IV of the ASME Boiler Code; The National Board Inspection Code (NBIC); Chapter 296-104 WAC and Chapter 70.79 RCW of the Washington State Boiler and Unfired Pressure Vessels Laws.**

Administration and General Requirements

- ☒ Every contractor shall be registered with the Department of Labor and Industries before installing or making repairs or modifications to any boiler. See RCW 18.27 and 18.106
- ☒ Every contractor shall apply for and obtain a permit from the boiler section prior to making the installation/reinstallation of any boiler. See WAC 296-104-020
- ☒ A minimum clear space of eighteen inches (18") shall be provided on all sides of the boiler. As a minimum, all other sides shall comply with the boiler manufacturer's installation instructions for clearances to combustible materials. See WAC 296-104-255, 260, 265, and 271
- ☒ The owner or user of any boiler required to be inspected upon installation/reinstallation shall not operate the boiler until a certificate-inspection has been made. See RCW 70.79.320
- ☒ All low-pressure steam boilers shall be constructed, stamped, and installed in conformance with Section IV of the ASME code. See WAC 296-104-200
- ☒ All low-pressure steam boiler fuel trains shall comply with the requirements of ASME CSD-1 (Part CF). See WAC 296-104-200

Instruments, Fittings, and Controls

















- ☒ Each steam boiler shall have a steam gage or a compound steam gage connected to its steam space or to its water column or to its steam connection. See Section IV HG-602
- ☒ The gage shall contain a siphon. See Section IV HG-602
- ☒ The gage connection to the boiler shall not be less than NPS ¼ inch. Where steel or wrought iron pipe is used the gage connection to the boiler shall not be less than NPS ½ inch. See Section IV HG-602
- ☒ The scale on the dial of a low-pressure steam gage shall be graduated to not less than 30 psi nor more than 60 psi. See Section IV HG-602
- ☒ Each steam boiler shall have one or more water gage glasses attached to the water column or boiler by means of valved fittings not less than NPS ½ inch,

with the lower fitting provided with a drain valve to facilitate cleaning. See Section IV HG-603


- ~~/~~ The lowest visible part of the water gage glass shall be at least 1 inch above the lowest permissible water level recommended by the boiler manufacturer. See Section IV HG-603
- ~~/~~ The minimum size of ferrous or nonferrous pipes connecting a water column to a steam boiler shall be 1 inch. See Section IV HG-604
- ~~/~~ The water column piping shall have a cross or equivalent fitting at every right angle turn to facilitate cleaning. See Section IV HG-604
- ~~/~~ No shutoff valves shall be placed between the steam boiler and water column. See Section IV HG-604
- ~~/~~ The water column drain pipe and valve shall be not less than NPS $\frac{3}{4}$ inch. See Section IV HG-604
- ~~/~~ Each automatically fired steam boiler shall be protected from overpressure by two pressure-operated controls. See Section IV HG-605
- ~~/~~ Each automatically fired steam boiler shall have a safety limit control that will cutoff the fuel supply to prevent steam pressure from exceeding the 15 psi maximum allowable working pressure of the steam boiler. See Section IV HG-605
- ~~/~~ Each automatically fired steam boiler shall have a control that will cut off the fuel supply when the pressure reaches an operating limit, which is less than the maximum allowable pressure. See Section IV HG-605
- ~~/~~ No shutoff valves shall be placed between the controls and steam boiler. See Section IV HG-605
- ~~/~~ The controls will be protected with a siphon. See Section IV HG-605
- ~~/~~ The control connection to the boiler shall not be less than NPS $\frac{1}{4}$ inch, if steel or wrought iron pipe is used it shall not be less than NPS $\frac{1}{2}$ inch. See Section IV HG-605
- ~~/~~ Each automatically fired steam boiler shall have an automatic low-water fuel cutoff so located as to automatically cut off the fuel supply when the surface of the water falls to the lowest visible part of the water gage glass. See Section IV HG-606
- ~~/~~ Fuel cutoffs and water feeding devices embodying a separate chamber shall have a vertical drain pipe and a blowoff valve not less than NPS $\frac{3}{4}$ inch, located at the lowest point in the water equalizing pipe connections so that the chamber and equalizing pipe can be flushed and the device tested. See Section IV HG-606


Installation Requirements

- ~~/~~ Safety valves and safety relief valves shall be located in the top or side of the boiler. See Section IV HG-701
- ~~/~~ Coil or header type boilers shall have the safety valve or safety relief valve located on the steam or hot water outlet end. See Section IV HG-701


-  Safety valves and safety relief valves shall be installed with their spindles vertical. See Section IV HG-701
-  The opening or connection between the boiler and any safety valve and safety relief valve shall have at least the area of the valve inlet. See Section IV HG-701
-  Safety valves and safety relief valves shall not be connected to an internal pipe in the boiler. See Section IV HG-701.4
-  No shutoff of any description shall be placed between the safety or safety relief valve and the boiler, or on discharge pipes between such valves and the atmosphere. See Section IV HG-701.5
-  A discharge pipe shall be used. Its internal cross-sectional area shall be not less than the full area of the valve outlet. See Section IV HG-701.6
-  The discharge from safety or safety relief valves shall be so arranged that there will be no danger of scalding attendants. See Section IV HG-701.6
-  The safety valve discharge shall be as short and straight as possible and so arranged as to avoid undue stress on the valve. See Section IV HG-701.6
-  Provisions shall be made for the expansion and contraction of steam mains connected to boilers by providing substantial anchorage at suitable points and by providing swing joints when boilers are installed in batteries. See Section IV HG-703.1
-  The return pipe connections of each boiler supplying a gravity return steam heating system shall be so arranged as to form a loop so that the water in each boiler cannot be forced out below the safe water level. See Section IV HG-703.2
-  Feedwater or water treatment shall be introduced into a steam boiler through the return piping system. See Section IV HG-705
-  Feedwater or water treatment shall not discharge directly against parts of the steam boiler exposed to direct radiant heat from the fire. See Section IV HG-705
-  The feedwater pipe shall be provided with a check valve near the steam boiler and a stop valve or cock between the check valve and the steam boiler or between the check valve and the piping system. See Section IV HG-705
-  In lieu of a check valve in the feedwater line, a back flow preventive device may be used if the device's minimum pressure rating is equal to the pressure stamped upon the steam boiler, and the temperature rating of such device including all internal components is not less than 250°F. If the back flow preventer does not meet these requirements a check valve shall be installed in addition to the back flow preventer. See Section IV HG-710
-  When a stop valve is used in the supply pipe connection of a single steam boiler, there shall be one used in the return pipe connection. See Section IV HG-710
-  A stop valve shall be used in each supply and return pipe connection of two or more boilers connected to a common system. See Section IV HG-710.3
-  The minimum pressure rating of all valves or cocks shall be at least equal to the pressure stamped upon the boiler, and the temperature rating of such

valves or cocks including all internal components, shall be not less than 250°F. See Section IV HG-710.4

 All cast iron steam boilers shall be provided with washout openings to permit the removal of any sediment. Washout plugs shall not be smaller than NPS 1 ½ inch for boilers having gross internal volume more than 5 cu ft. Washout plugs shall not be smaller than 1 inch for boilers having gross internal volume not more than 5 cu ft. See Section IV HC-325

 Each steam boiler shall have a bottom blowoff connection fitted with a valve or cock connected to the lowest water space practicable with a minimum size as shown in the following table. See Section IV HG-715

Minimum Required Safety Valve Capacity Lb of Steam/Hr	Blowoff Pipe Size Inches
Up to 500	¾
501 to 1250	1
1251 to 2500	1 ¼
2501 to 6000	1 ½
6001 and larger	2

 Steam boilers having a capacity of 25 gal or less are exempt from the above valve sizing requirements, except that they must have a ¾ in. NPS minimum drain valve connected to the lowest water containing space. See Section IV HG-715

Note: Make certain that all items listed above are in compliance prior to requesting an inspection on a new or reinstalled boiler.